

in western and southern Germany, such as Rheinland-Pfalz (GRÜNWARD and PREUSS 1983, 1987), Baden-Württemberg (BRAUN 1989), Nordrhein-Westfalen, Bayern, and Hessen (NOWAK et al. 1994). Recently, roof rats were re-discovered in some of these areas.

Roof rats were detected in all but two small federal states, Schleswig-Holstein and Saarland, during the last 20 years (Fig. 1). Most populations in western Germany were detected in harbour areas along rivers. We found them in grain mills, food mills and silos along the river Main in the cities of Würzburg (1997) and Hanau (1995), and downstream of the Rhine River in cities, such as Cologne (1999), Düsseldorf (1996), Neuss and Wesel (1995). Roof rats were also detected in southwest Germany (BRÜNNER and TROJE 1991), at the Bodensee (lake of Constance) (WILHELM, BRAUN, and DIETERLEN, pers. comm.) and in the area of the middle Rhine (DALBECK 1996).

In all regions, we observed the colour variations "rattus", "alexandrinus", and "frugivorus". In Hanau on the river Main and in Cologne on the Rhine River, we found pure populations of black rats. However, due to small sample sizes and specimens lacking fur, such as skulls and bones, characterization of a representative number of populations was not feasible. In general, the three variations of fur colour appear purely or in mixed populations in Germany.

Although large populations of roof rats appeared in habitats such as pig farms, grain mills and silos, light infestations were also detected on small farms, in restaurants and in small food-producing factories. Even in rural residential buildings a few roof rats were observed. Such infestations were reported solely where large rat populations were established nearby. Although many occurrences of roof rats probably remained unnoticed, our data support a previous evaluation that this species is not endangered in Germany (BOYE et al. 1998). Conservation measures are neither necessary nor reasonable because roof rats represent a pest in the food industry and agriculture.

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Short communication

Caecotrophy in pacas (*Agouti paca* Linnaeus, 1766)

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Caecotrophy, a physiological process which was early documented in rabbits (MOROT 1882), is recognised to occur in mammals of different species (*Gorilla gorilla*: HARCOURT and STEWART 1978; *Phascolarctos cinereus*: OSAWA et al. 1993; *Hydrochaeris hydrochaeris*: BORGES et al. 1996; *Myocastor coypus*: TAKAHASHI and SAKAGUCHI 1998). Nevertheless, it has been best documented for lagomorphs and some rodents (STILLINGS and HACKLER 1966; PICKARD and STEVENS 1972; BJÖRNHAG and SJÖBLOM 1977; CRANFORD and JOHNSON 1989; SOAVE and BRAND 1991; MAROUNEK et al. 1995). These herbivores ingest differentiated faeces and absorb the protein and carbohydrates synthesized by caecal microorganisms.

The paca (*Agouti paca*) is the second largest neotropical hystricognath rodent with an adult average body weight of 8 kg. It is distributed from southern Mexico to northern Argentina, in practically all forest habitats up to 2000 m of altitude (WOODS 1984). This species has become locally extinct in overhunted areas of Central America (EMMONS 1990), and is considered vulnerable to extinction in some areas of Brazil, because of the reduction of its habitats and hunting pressure (AYRES et al. 1991; VICKERS 1991; BERGALLO et al. 2000). These mammals are mainly frugivorous

(MONDOLFI 1972), but SMYTHE et al. (1983) suggested that pacas could browse on leaves and seedlings during fruit shortage seasons.

A study of the behavioural patterns of 11 pacas in captivity was conducted at the Universidade Estadual Paulista, in Jaboticabal, Brazil between February and March of 1998. Animals were grouped as four mated pairs (three of them with a female offspring) housed separately in 10 m² pens, installed in an open outdoor area. The pens had a 1.7×0.7×0.35 m tank full of water; a brickwork den of 1.0×0.75×1.0 m with a mobile wood cover at the top, and a 0.30×0.30 m entrance near the floor closed by a mobile metal blind. Although living in captivity, these pacas showed nocturnal habits. Every morning around 9.00 h, faeces and remaining food were removed, drinking water was changed, the water tanks filled, and 1 kg of hay was placed on the floor, 0.8 m from the entrance of the artificial burrows. Each group was fed with approximately 240 g of rodent food at 9.00 a.m., and at 5.00 p.m. They received seasonal tropical fruit, green maize, and chopped raw manioc for evening and night consumption. To supply their need for gnawing, three to four fresh pieces of eucalyptus